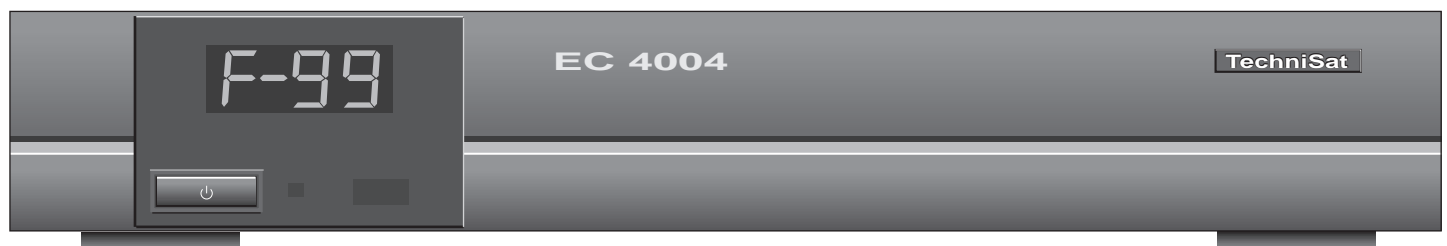


TechniSat[®]

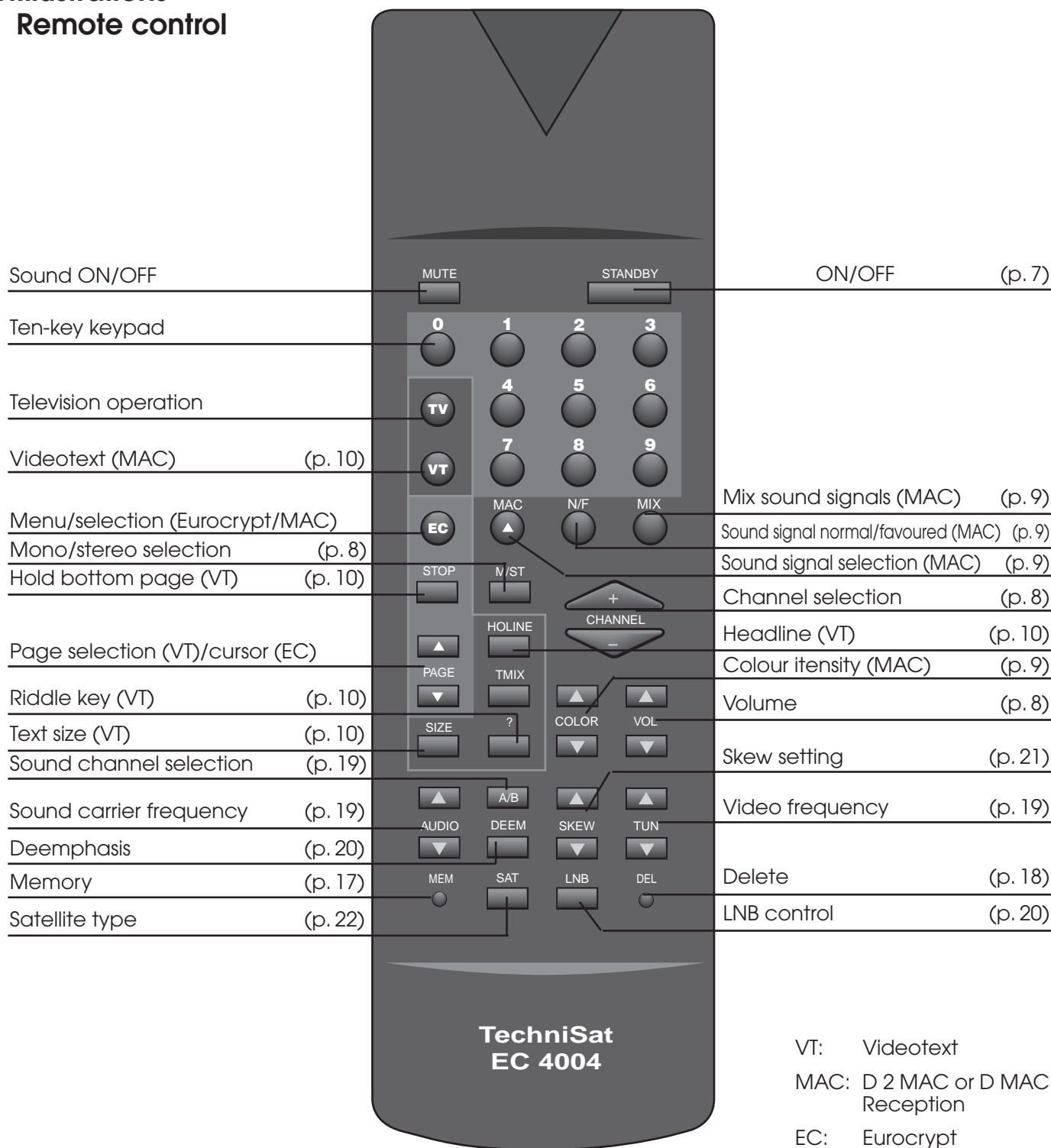
Operating instructions *Satellite receiver*

EC 4004

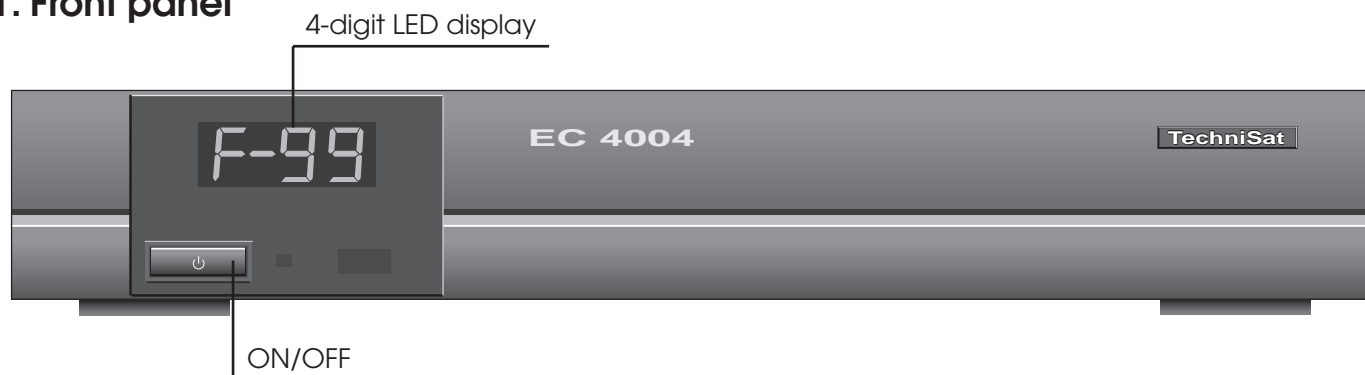


TechniSat Satellitenfernsehprodukte GmbH · Postfach 560 · 54541 Daun

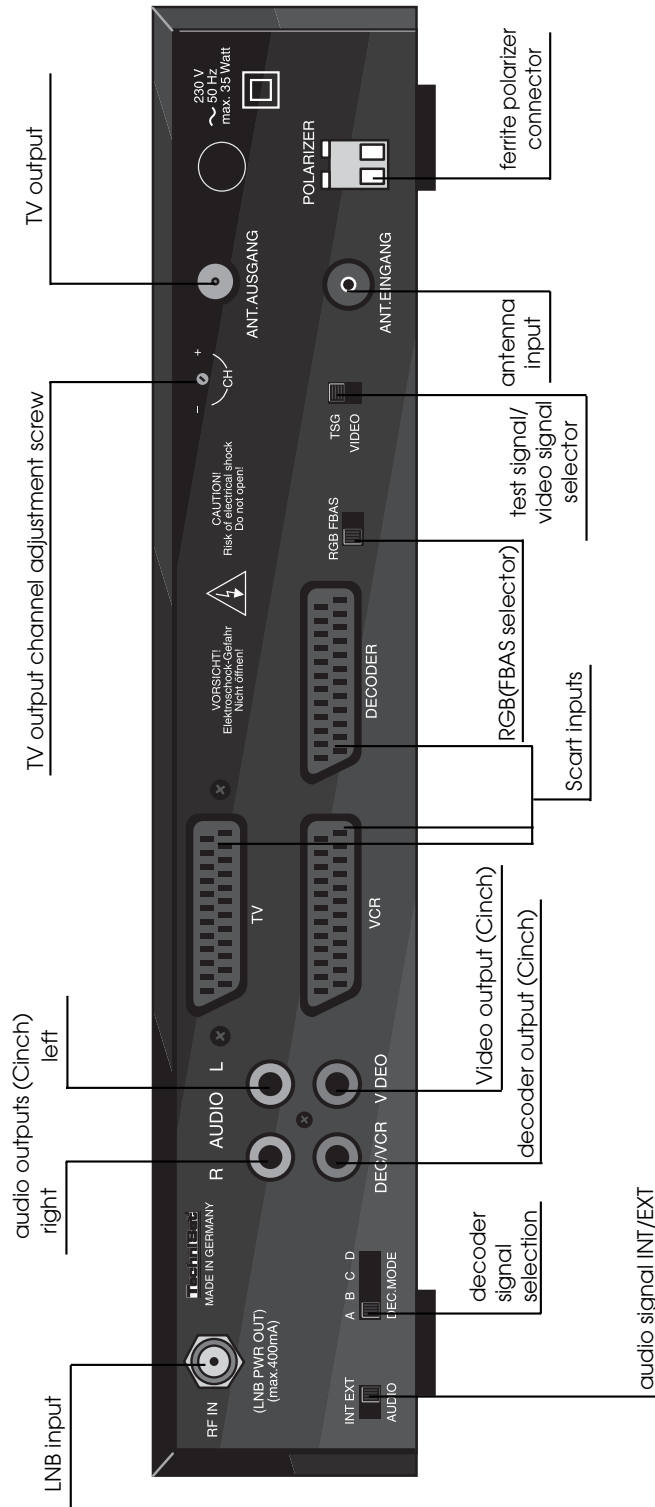
1. Illustrations
Remote control



1. Front panel



Back panel

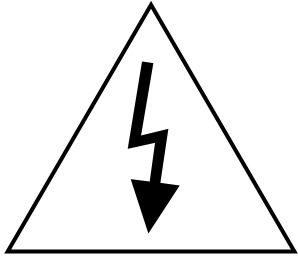


Edition 4/95 ; instructions are subject to changes due to technological advance.

Contents

	Page	
1	Illustrations	
2	Safety instructions	5
3	Connection	6
3.1	Outdoor unit and television set	6
3.2	Hifi amplifier	7
3.3	Video cassette recorder (VCR)	7
3.4	External decoder	7
4	Operation	8
4.1	General	8
4.1.1	Switching on and off	8
4.1.2	Channel selection	8
4.1.3	Volume	8
4.1.4	Mono/stereo	8
4.2	D/D2 MAC reception	8
4.2.1	Colour intensity	9
4.2.2	Sound channels	9
4.2.3	MIX operation	9
4.3	Teletext	10
4.3.1	Page selection	10
4.3.2	Special functions	10
4.4	Eurocrypt reception	11
4.4.1	Menu language	11
4.4.2	Subtitles	12
4.4.3	Subscription	13
4.4.4	Access control	15
4.4.5	Automatic on screen display	16
5	Programmation	17
5.1	Preprogrammed channel tables	17
5.2	Individual channel table	17
5.2.1	Channel order	17
5.2.2	Deleting	18
5.2.3	Channel settings	19
5.2.3.1	Video settings	19
5.2.3.2	PAL audio settings	19
5.2.3.3	MAC audio settings	20
5.2.3.4	LNB voltage	20
5.2.3.5	Example	21
6	Preprogrammation	22
6.1	Satellite types	22
6.2	Preprogrammation	22
6.2.1	General	22
6.2.2	Preprogrammed channels	23
7	Troubleshooting notes	34
8	Technical data	35

2. Safety instructions



For your own protection carefully read the safety precautions before starting to use your new device.

The manufacturer is not liable to damage caused by improper handling or by disregarding the safety precautions.

Take care that empty remote control batteries are not put into the household waste but disposed off properly (return to specialist stores, special waste)

Styrofoam packing harmful to the environment has not been used. The packing which can be recycled corresponds to the requirements of the new packing regulations.

Never open the device. There is danger of an electric shock. Repairs should only be carried out by qualified specialists.

Heating and ventilation: The housing cover contains slots for the required ventilation which are not to be covered during operation. Do not use the device near heatings, stoves or other heat sources.

Water and humidity: Protect your device against liquids and do not use it in rooms with high **air humidity**.

Power supply: Only connect the device to power sources indicated on the device or in the operating instructions.

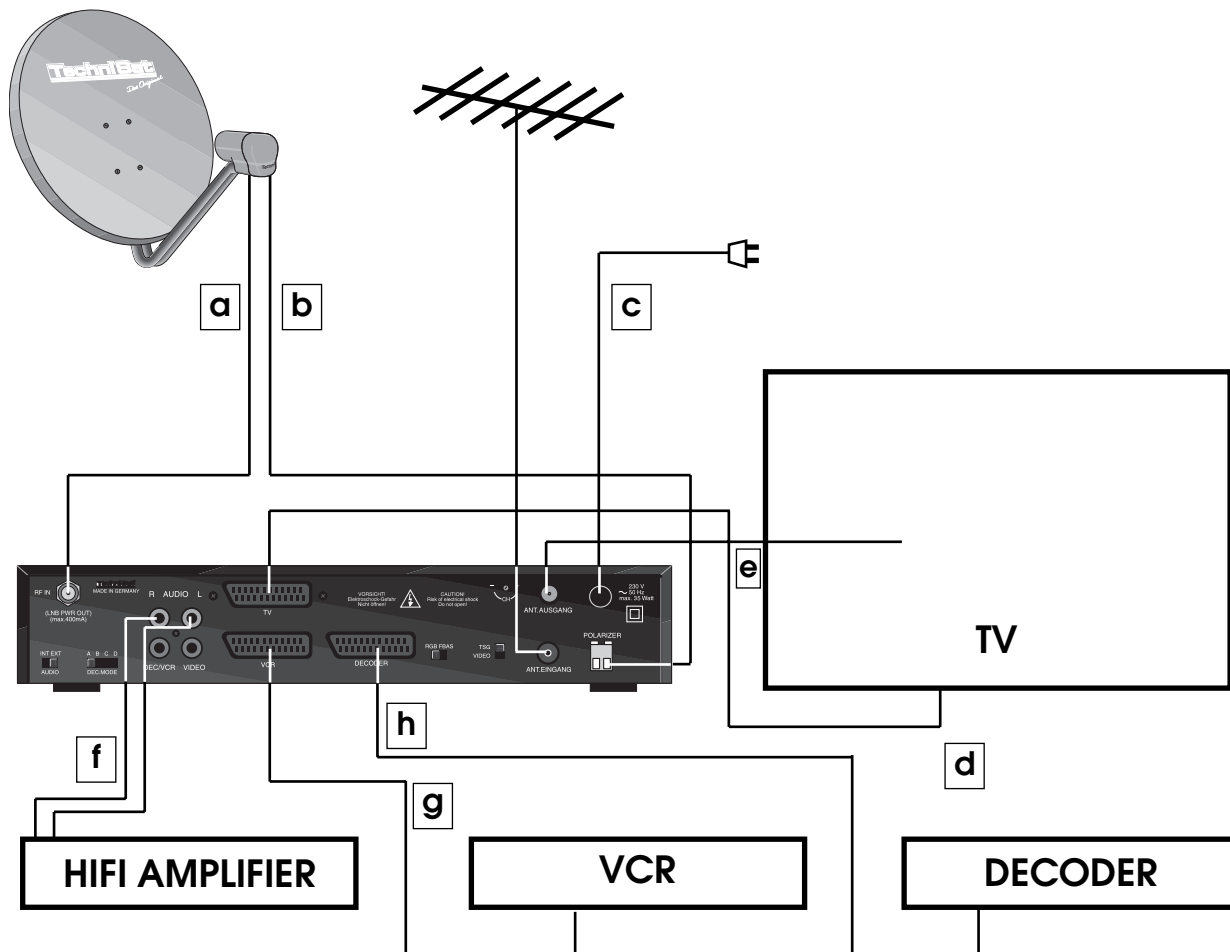
Cleaning: Before cleaning the device unplug the connector and use a moistened cloth.

Operation interruption: During a storm or when operation is interrupted for a long time disconnect the device from mains.

In the following cases disconnect the device from mains and ask a specialist for help:

- **the power supply cord or the connector are damaged**
- **the device was exposed to humidity or a liquid has flown into the device**
- **in case of considerable malfunctions**
- **in case of considerable external damage.**

3. Connection



3.1 Outdoor unit and television set

- Connect the receiver with the LNB of the outdoor equipment using a special coax cable (TechniSat Coax-Sat 2050).
- If available, connect the ferrite polarizer to the polarizer terminal clips. To fasten the cables you may want to remove the polarizer plug from the receiver.
- Connect the receiver to a socket of 230 V/50 Hz. When the LNB input is short-circuited, the receiver switches off the LNB supply voltage and displays a blinking danger signal "Sh-C" (short circuit). Unplug the connector and eliminate the short circuit.
- Use a SCART cable to connect the receiver (SCART input "TV") with the television set (SCART input). If your television set does not automatically switch to AV (audio/video) operation, you have to switch manually.

When receiving D or D2 MAC channels the receiver also supplies a so-called RGB signal. If your TV set has corresponding inputs, it automatically switches to RGB operation when the RGB/FBAS switch is in "RGB" position. This makes best picture quality possible. When PAL channels are received the switch position is ineffective.

- e) If your television set does not have an AV input, you can also connect the receiver's antenna output to the antenna input of the television set using an antenna cable. Plug the cable coming from the antenna into the antenna input.

Your television set has to be adjusted to the transmission channel of the receiver.

- > switch to "TSG" (test signal) on the receiver
- > select a free channel on your TV set
- > adjust the television set to channel 39

If channel 39 is occupied by a channel that can be received via antenna, you can adjust a different transmission channel in the range of 32 to 42.

- > adjust unoccupied channel on the television set
- > use a little screwdriver to turn "+ -" (channel) until the test picture is displayed
CH
- > set the modulator on the receiver to "video"
- > possibly precise adjustment on the television set

3.2 Hifi amplifier

- f) In order to achieve maximum sound quality the receiver can be connected to a Hifi amplifier. Use an adequate amplifier input (e.g. CD, Aux; Warning, the "phono" input is not appropriate!) to link it with the receiver's audio R/L cinch jacks.

3.3 Video cassette recorder (VCR)

- g) Connect the video recorder to the SCART input "VCR".
When the video cassette recorder is used, it supplies the receiver with a switch signal in order to redirect its audio and video signals to the SCART input "TV" and, when the receiver is switched on, also to the antenna output. When using the video recorder via the SCART output, the receiver should not be set to a MAC channel in order to avoid image interferences.

3.4 External decoder

- h) In addition to the installed Eurocrypt decoder you can connect another decoder to the SCART input "DECODER". To adjust to different decoder types you can select "DEC.MODE" on the receiver's back panel to switch between 4 decoder signals.

- A: unapplied, unfiltered, without deemphasis ("flat")
- B: unapplied, unfiltered, with deemphasis (baseband)
- C: unapplied, filtered, with deemphasis (video unapplied)
- D: applied, filtered, with deemphasis (video applied)

Find out from the operating instructions of the decoder which signal is necessary.

When the channel also encodes the audio signals, set the switch "AUDIO INT/EXT" on the receiver's back panel to "EXT" and the audio signals of the receiver are led to the decoder.

When the external decoder supplies an RGB signal (e.g. text displays) the two left display elements indicate "= =" on the receiver.

4. Operation




4.1 General

4.1.1 Switching on and off

After being turned on, the receiver reselects the channel which was set before the device has been switched off. Yet, if in the meantime the power supply has been interrupted, the device selects channel 1 upon powering up.

- > switch on and off with  or  or
- > switch on with ten-key keypad

4.1.2 Channel selection

- > with ten-key keypad
- > 7 8
- > 3 (wait 4 s)
- > 0 3
- > with  on remote control or   on receiver

F-78

F-3

F-3

4.1.3 Volume

- > with  lower
- > with  higher
- > turn off with 


U0 23

U0 22

U0 24

F-3

4.1.4 Mono/stereo

- > select  to switch between mono
- > and stereo

- 0 -

0 - 0

4.2 D/D2 MAC reception

The reception of MAC channels is indicated by the second display element with a c. The following displays identify the different screen formats:



- > screen format 4:3
- > screen format 16:9

F c 67

4.2.1 Colour intensity

F C 67





The colour intensity can only be modified when receiving D-MAC or D2 MAC channels. When the receiver has been disconnected from the power supply, the standard value is reset.

- > with  intensity higher
COLOUR
- > with  intensity lower
COLOUR





4.2.2 Sound channels

MAC channels have 8 (D2 MAC) or 16 (D MAC) sound channels which the channel issuer can use for example for the broadcasting of different languages.

a) "Normal" sequence (determined by the channel issuer)

- > press  until "nor" is displayed
- > switch continuously with  or 
- > select directly with  plus numerical key.

b) "Favoured" sequence (sorted on languages)

- > press  until "FAV" is displayed
- > switch continuously with  or 
- > select directly with  plus numerical key.

The numbers 1 to 8 represent the following languages:

1: German	2: English	3: French
4: Italian	5: Spanish	6: Dutch
7: Danish	8: Swedish	


When the selected sound channel is not occupied, the permanent television primary sound is activated.

- > press  to memorize (e.g. using a ball point pen)

4.2.3 MIX operation

Channel issuers have the possibility of combining two sound channels (for example the stadium noise and the comment in a football match broadcast).

The receiver automatically detects and mixes these sound channels.

Press  to turn off the MIX sound mode and to listen to the main channel only (for example the comment). The

setting cannot be memorized.

4.3 Teletext

Teletext broadcasts can only be received on D or D2 MAC channels. The key functions described in the following section are only effective in teletext operation.

> select MAC channel with teletext service.

> press 

Fc 67

The television picture disappears and the teletext overview (p.100) is displayed, in case it exists.

Ft 67

4.3.1 Page selection

> enter a number with three digits, e.g. 2 0 0 or

> press  to toggle the page numbers up or down

The page is searched in the memory and is displayed on the screen after some seconds, in case it exists.

Some teletext pages consist of several subpages which are displayed automatically.

> select  to hold and release the subpage

4.3.2 Special functions

> press 

The standard television picture is displayed again, this time with a teletext headline, including (from left to right):


selected page number, current page number, channel name, date, time.

> with  back to teletext operation

> press 

The television picture is displayed in the background between the text lines.

> with  back to teletext operation

>  pressed for the first time: upper screen half with double height
 pressed for the second time: lower screen half with double height
 pressed for the third time: entire screen with standard height

> press 

An overview of the pages in the text memory is displayed. You can select them immediately (without page search).

> press  for teletext operation

Some teletext pages (for example riddle) contain hidden information that you can reveal and

hide again pressing  ("riddle key").

> with  or  back to television operation



4.4 Eurocrypt reception

EUROCRYPT is an encoding method for MAC channels. For the reception you need the decoder installed in the EC 4004 and a valid smart card which you can obtain in special stores or directly from the channel issuer.

- > select the Eurocrypt encoded MAC channel

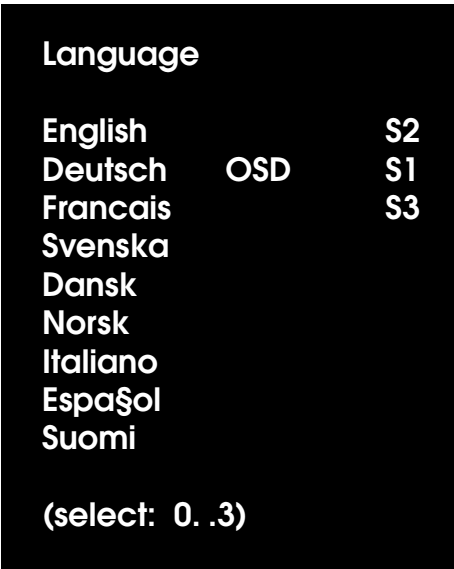
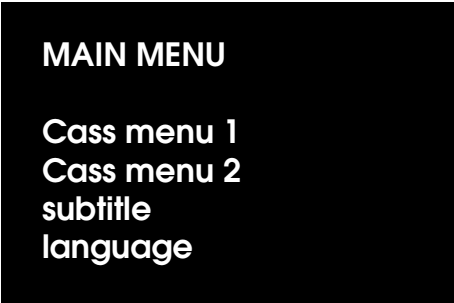
The message "insert the card" or "??????" is displayed on the screen.

- > slide the valid smart card into the card slot (contacts face down, in direction of the arrow until completely inserted).

If your card is valid for the channel and fully inserted, an uncoded picture is displayed after a few seconds. Otherwise please observe 4.4.5.

4.4.1 Menu language

- > select a Eurocrypt encoded MAC channel
- > press **EC**
- > press **PAGE** until "language" is marked green
- > press **EC**
- > press **PAGE** until desired language (for example "German") is marked green
- > press "0" to set the OSD language
- > memorize with **EC** or
- > press **STOP** to return to television operation without memorizing



4.4.2 Subtitles

You can enter a preference list with up to three languages. If subtitles are broadcasted in one of these languages they will be displayed on screen automatically.

> call the menu "language" (see 4.4.1 menu language)

Language

English		S2
Deutsch	OSD	S1
Français		S3

Svenska

Dansk

Norsk

Italiano

Español

Suomi

(select: 0..3)

> mark the first language with  and press "1"

> mark the second language with  and press "2"


> mark the third language with  and press "3"

> select  to memorize the languages

> press  to return to television operation without memorizing

A second menu shows the currently existing subtitles.

> press 

> select  to mark the "subtitle"

> press 

SUBTITLE


*** off ***

Swedish

Norwegian

Danish

If your preferential languages are supplied, the highest ranking language displayed green.

Otherwise you can select one of the supplied languages pressing . However, this selection is only effective until one of the languages is available as a subtitle.

Languages shown in brackets have been selected by you, but they are not available at present.

Mark the line " ***off*** " with  and press  to switch off the subtitle.

4.4.3 Subscription

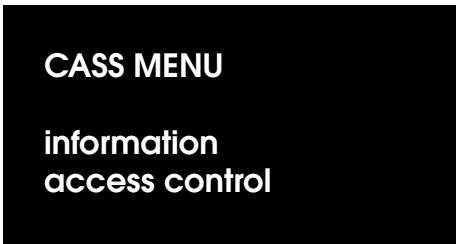
Open the CASS menus ("CASS" = "Conditional Access SubSystem", see 4.4.4. access control) to view your subscription details.

In Eurocrypt S the card determines the appearance of the CASS menus; therefore, they may differ from the menus described below. CASS menu 1 is valid for the right card reader and CASS menu 2 for the left one.

> press **EC**

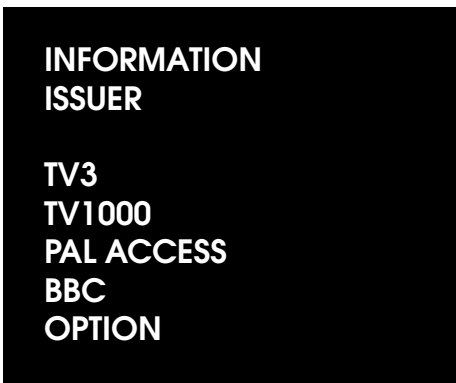
> select **PAGE** to mark "CASS menu 1"

> press **EC**



> select **PAGE** to mark "information"

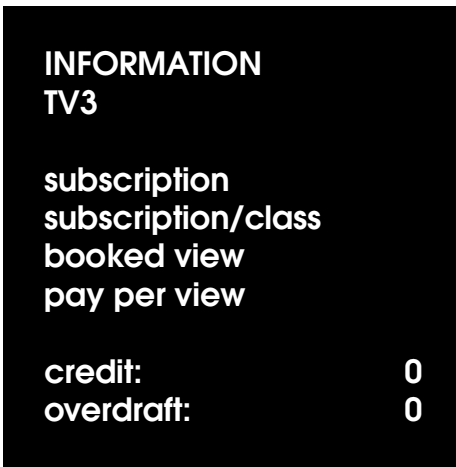
> press **EC** A list of channel issuers is displayed, for example:



You can select an issuer, view your current subscription details and the price for a channel to pay per view.

In case there is no subscription/offer the message "no entry" is displayed in red.

The submenu for TV3 could for example look like this:



Subscription:

You can subscribe certain kinds of programmes for a certain period of time. What you have to pay is independent of what you actually watch.

In the submenu you find a table that tells you which categories you have subscribed for which period of time and at which level.

Extensive lists that do not fit on the screen are divided into several pages. Select PAGE to scroll from one page to the other.

The following kinds of programmes ("categories") are fixed:

- | | | |
|-----------------|-------------------------|------------------|
| - art | - children's programmes | - clublife |
| - entertainment | - movies | - lifestyle |
| - music | - news | - series |
| - sports | - special programmes | - nature |
| - mini series | - science | - all programmes |
| - documentaries | | |

Some programmes come with graded access levels. The issuer can bind programme categories to bundles.

Subscription/class:

This kind of subscription works in a similar way, the only difference is that there are "classes" represented by code numbers instead of "programme categories".

Booked view:

You can select and buy certain programmes with the help of a programme preview. The price does not depend on which of the leased programmes you actually watch.

The submenu shows a list of the programmes you have leased.

Pay per view:

The Eurocrypt card has an account that is reduced when watching TV (similar to a telephone card). That means you only pay for the programmes you are actually watching.

The submenu informs you of the programmes that are available and their price. At the same time the following question is displayed:

Do you want to buy this programme?


- Yes
- No

If you answer with yes, the decoding procedure starts. Otherwise the question is repeated in certain periods of time.

At the beginning of the submenu a list shows the programmes that you have payed for before.

The last two lines give you an overview of your pay per view credit account with the respective provider.

4.4.4 Access control

Mark the line "CASS menu" in the main menu and press 

Mark the line "Access control" in the CASS menu and press 

ACCESS CONTROL

programme purchase
information
childproof control feature
new access code

With the help of this menu you can impose and remove access restrictions. The restrictions are only effective if you enter a secret number other than zero.

New access code:

Select the menu item "New access code" and enter your access code by pressing the numerical keys. Each input number is echoed with a " * ". Afterwards you have to re-enter the access code and the new code is only valid when the first and second entries are identical. Otherwise you have to repeat the whole procedure.

Warning!

If you forget your access code you cannot watch Eurocrypt programmes with this card any longer and you have to consult the issuer.

A new card has always the access number zero.

You delete your access code by entering "0000". Of course, this is only possible if you have duly entered your most recent access before.

Once you have correctly entered the access code, all functions are re-enabled. They will not be disabled before you turn off the receiver (STANDBY). After turning on the receiver, the access code is requested again.

Programme purchase:

The submenu offers the possibility to "enable" or "disable" programme purchase. If you select "disable", you can only buy programmes after having entered your access code. If the buy is "enabled" you do not need the access code.

Information:

You can disable or enable the access to the information menus.

If you select "disable" you only have access after having entered your access code.

Childproof control feature:

When you select this line, the following submenu is displayed:

After the selection of an age-group, only programmes with an adequate identification are decoded.

CHILDPROOF CONTROL FEATURE

U all
PG with supervisor
12 and older
15 and older
18 and older

4.4.5 Automatic on screen display

If you receive a EUROCRYPT service, troubleshooting notes or other information may be displayed:

"Insert the card"	no card in the slot
"Check the card"	the card is not valid, broken or inserted incorrectly.
"No access"	the card does not entitle to receive the current programme or the user has activated an access restriction.
"Regional reception disabled"	the current programme is not allowed to be watched for legal reasons in the respective country
"Overdraft"	you have no more credit
"New RTXT page"	a customer specific message has been received from the broadcasting service. Switch on teletext and search for the respective page.
"Error 2: incorrect access code"	you have entered the access code incorrectly.
"Error 3: card memory full"	the card can no longer receive certain information (for example a new access code)
"Error 4: service memory full"	the card can no longer receive programme specific information, for instance the subscription for this programme cannot be prolonged. Try to obtain a new card.
"Error 5: HASH error"	a transmission error has occurred between the broadcasting service and your receiver. This is often caused by the broadcaster or the transmission path. If this occurs repeatedly you should consult the channel issuer or your TV dealer.
"Write error"	the card cannot be overwritten. The card or the receiver are deficient.

5 Programming

5.1 Preprogrammed channel tables

The receiver is preprogrammed for the reception of 396 television and radio channels. The channels are listed on

4 tables which can be found in chapter 6.2.

Table 1: channels from ASTRA 1A, 1B, 1C and 1D: Unysat LNB LOF 9.75 GHz



Table 2: channels from ASTRA 1A, 1B, 1C: LOF 10.0 GHz

Table 3: channels from different satellites for CombySat LNB

Table 4: channels from different satellites for Tripleband LNB

Additionally, there is a user table which you can use to customize your channel collection. This table is identified with "F" on the display. For a device in factory configuration, this corresponds to table 1.

You can select individual channels from a table without modifying the user table.

- > to call a preprogrammed table
- > press  and then press
- >  until you reach the desired table

F-1

SAT 1


TAB 1

TAB 2

C-15

- > finally enter the desired channel number.

You have just selected channel 15 from table 2 without memorizing it. Take into account that a picture is only displayed if your receiving equipment is appropriate for the channel.

- > select  and then the channel position number to
- > memorize this channel in the user table.

C-15

St-

St 12

F-12

SAT 1

TAB 4

St 99

:

St 1

- > to load and memorize a preprogrammed table

- > press  quickly followed by 

- > until you reach the desired table.

- > Then immediately press the recessed MEM key using a ball point pen and the

- > desired table is memorized as user table.

5.2 Individual channel table



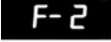
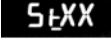
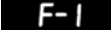
5.2.1 Channel order

Example: You want to change the order of the first two channels, ARD and ZDF.

- > select channel 1, ARD.


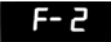



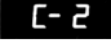

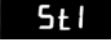
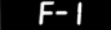
F-1

St 2

- > Press  and enter "02".
- > press  for a second time or wait approx. 4 seconds, and ARD is memorized on channel 2.
- > As long as the memory display is on screen you can interrupt the process by  
- > pressing other keys, for example the channel selection keys. 

Warning: If you do not enter a number after pressing , the channel remains in the old position (in our example: 01).

Since channel 2 in the user table is now overwritten by channel 1, you must copy ZDF from table 1.

- > press  quickly followed 
- > by .  
- > select ZDF with "02" 
- > and memorize this by pressing  and by entering "01".  




Now you have stored ZDF to channel 1 of the user table.

5.2.2 Deleting

You can only delete channels in the user table!

- > select the undesired channel and 
- > press the recessed  key using a ball point pen.  

Now the channel position is deleted and is skipped when switching the channel selection keys. If you directly enter the channel number, the respective channel is taken from the most recently selected preprogrammed table.

- > to delete the entire user table, press , ,  shortly one after another.


Consequently, the channel selection keys are ineffective.

5.2.3 Channel settings

New channels which are not part of the preprogramming can be readily added.

As soon as you modify the channel settings, the table identification changes from "F" to "H".

Only when you have memorized the modifications by pressing , "F" is re-displayed.

Important: Numerical entries only become valid, when the screen returns to channel display. Only then are you allowed to make further entries. When repeatedly pressing the same key, for example the sound channel key , you should not make long breaks.


5.2.3.1 Video settings

> Pressing the  key, the display shows the receive frequency in MHz (950 to 2050). 


There are two ways to enter new receive frequencies :


> enter them directly with the numerical keys 

> or pressg  to increase or decrease the value 


When holding the  keys depressed, the frequency changes continuously, starting at 1 MHz steps followed by 5 MHz increments, after 10 changes.

Improper entries via the ten-key keypad will be acknowledged by the error message "Err".



You can set the video level by pressing the  key repeatedly. Satellites and their corresponding satellite types are listed in chapter 6.1, satellite types.

Press the  key to memorize your settings and, if necessary, enter a new channel number.

5.2.3.2 PAL audio settings

Select the PAL channel whose audio settings you want to modify.

> press  until the desired sound channel is displayed. 

> Use the numerical keys or the  keys to set the new audio frequency. 

> To receive in stereo press , 

> set the second audio frequency and



> then switch to stereo operation pressing M/ST.



The display responds to improper entries with "Err."

When holding the  keys depressed, the frequency changes continuously, starting at 10 kHz steps followed by 50 kHz increments, after 10 changes.

You can set the audio bandwidth and the deemphasis by pressing the SAT key repeatedly. Satellites and their corresponding satellite types are listed in chapter 6.1, satellite types.

Press the  key to memorize your settings and, if necessary, enter a new channel number.

The deemphasis can also be set independent of the satellite type, but cannot be memorized.

> When pressing  repeatedly, you can cyclically switch between the deemphasis settings.




> In the adaptive setting the sound assessment is compatible to the WEGENER-PANDA method.





> Make sure that the right sound channel is selected.

5.2.3.3 MAC audio settings

Chapters 4.2.2 and 4.2.3 describe all possible MAC channel settings.

5.2.3.4 LNB voltage

With  you can switch cyclically between the following LNB voltages:

14 V, no modulation



18 V, no modulation




14 V, modulated with 22 kHz



18 V, modulated with 22 kHz



This allows you to control two V/H LNB's by using an adequate switch (for example MULTYSAT switch).

Press the  keys to toggle the polarizer current between "-60" (-60 mA) and "+60" (+60mA). The value changes by 2 units per key depression. Hold the key depressed to change the value continuously.















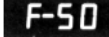
5.2.3.5 Example

The following example is a short explanation of the most important settings. Please observe chapter 5.2.3 "channel settings" in order to enter the parameters correctly.

The radio channel RADIOROPA INFO (subcarrier of PRO7) is to be memorized to channel 50. ASTRA reception is assumed.

1. select table 1 with  an  and  then enter "03" by using the ten-key keypad. 

Now the picture of PRO7 should be displayed, if not, please follow instructions 2, 3 and 4.

2. press the TUN key, check the receive frequency 
3. set LNB voltage 
4. when using a polarizer optimize the SKEW value. 
5. press the  key and enter the frequency for channel A 

6. press  and enter the frequency for channel B 
7. press  to select stereo operation 
8. press  to set the optimal parameters for audio bandwidth, deemphasis and video level of the channel. 

9. The data is memorized in the user table by pressing  and entering the desired channel number. 

6. Preprogramming

6.1 Satellite types

			Audio frequency
"SAT 1"	(Prototype: ASTRA) Deemphasis:	50 (s up to adaptive from	6.89 MHz 6.90 MHz
	Bandwidth:	200 kHz up to 130 kHz from	6.89 MHz 6.90 MHz
	Video amplification:	high	
"SAT 2"	(Prototype: EUTELSAT) Deemphasis:	50 (s up to adaptive from	6.89 MHz 6.90 MHz
	Bandwidth:	380 kHz up to 130 kHz from	6.89 MHz 6.90 MHz
	Video amplification:	low	
"SAT 3"	(Prototype: TELECOM 2) Deemphasis:	J17 for	all
	Bandwidth:	280 kHz for	all
	Video amplification:	low	
"SAT 4"	Deemphasis:	J17 for	all
	Bandwidth:	380 kHz for	all
	Video amplification:	low	

6.2 Preprogramming

6.2.1 General

On MAC broadcasting services the two numbers of the digital sound channels which are set when you select "normal" or "favoured" are preprogrammed instead of the two audio frequencies.

This is why the audio column of the table reads

dig n# f#

(# meaning one of the numbers from 1 to 8).

6.2.2 Preprogrammed channels

Table 1: UnySat V/H LNB for ASTRA
 LOF: 9.75 GHz in the range of 10.7 ... 11.699 GHz
 V/H LNB for TV Sat
 LOF: 10.750 GHz in the range of 11.7 ... 12.499 GHz

polarization switching voltage: 14/18 volts

Channel programme	Transponder frequency GHz	1. IF MHz	Sound IF		mono stereo	Polarization	LNB voltage volt	SAT
			left	right				

Astra 1A+1B+1C, 19.2° east, television

1 : ARD	11.494	1744	7.02	7.20	S	H	18	1
2 : ZDF	10.964	1214	7.02	7.20	S	H	18	1
3 : PRO 7	11.406	1656	7.02	7.20	S	V	14	1
4 : SAT 1	11.288	1538	7.02	7.20	S	V	14	1
5 : RTL Television	11.229	1479	7.02	7.20	S	V	14	1
6 : RTL 2	11.214	1464	7.02	7.20	S	H	18	1
7 : West 3	11.053	1303	7.02	7.20	S	H	18	1
8 : Bayern 3	11.141	1391	7.02	7.20	S	H	18	1
9 : Suedwest 3	11.186	1436	7.02	7.20	S	V	14	1
10 : Nord 3	11.582	1832	7.02	7.20	S	H	18	1
11 : MDR 3	11.112	1362	7.02	7.20	S	H	18	1
12 : 3 sat	11.347	1597	7.02	7.20	S	V	14	1
13 : Vox	11.273	1523	7.02	7.20	S	H	18	1
14 : DSF	11.523	1773	7.02	7.20	S	H	18	1
15 : Eurosport	11.259	1509	7.20	7.02	M	V	14	1
16 : n-tv	11.641	1891	7.02	7.20	S	H	18	1
17 : M T V EUROPE	11.538	1788	7.02	7.20	S	V	14	1
18 : CNN	11.627	1877	7.02	7.20	M	V	14	1
19 : Sky news	11.377	1627	7.02	7.20	S	V	14	1
20 : Galavision	11.127	1377	7.02	7.20	S	V	14	1
21 : Cartoon / TNT	11.023	1273	7.02	7.20	S	H	18	1
22 : RTL 5	10.936	1186	7.02	7.20	S	H	18	1
23 : RTL 4	11.391	1641	7.02	7.20	S	V	14	1
24 : Premiere	11.464	1714	7.02	7.20	S	H	18	1
25 : Teleclub	11.332	1582	7.02	7.20	M	H	18	1
26 : FilmNet Plus	11.362	1612	dig	n1 f1	S	H	18	1
27 : TV 1000	11.303	1553	dig	n1 f1	S	H	18	1
28 : TV 3 Schweden	11.244	1494	dig	n1 f1	S	H	18	1
29 : TV 3 Daenemark	11.612	1862	dig	n1 f1	S	H	18	1
30 : TV 3 Norwegen	11.671	1921	dig	n1 f1	S	H	18	1

Channel programme	Transponder frequency GHz	1. IF MHz	Sound IF		mono stereo	Polarization	LNB voltage volt	SAT
			left	right				
31 : FilmNet CMC	10.921	1171	7.02	7.20	S	H	18	1
32 : JSTV	11.568	1818	7.02	7.20	S	V	14	1
33 : Sky one	11.318	1568	7.02	7.20	S	V	14	1
34 : Sky Movies	11.436	1686	7.02	7.20	S	V	14	1
35 : Movie Channel	11.479	1729	7.02	7.20	S	V	14	1
36 : Sky Movies Gold	11.597	1847	7.02	7.20	S	V	14	1
37 : Sky Sports	11.509	1759	7.02	7.20	S	V	14	1
38 : Sky Sports 2	11.171	1421	7.02	7.20	S	H	18	1
39 : Nickelodeon	11.156	1406	7.02	7.20	S	V	14	1
40 : Bravo	11.097	1347	7.02	7.20	S	V	14	1
41 : Discovery / CMT	11.082	1332	7.02	7.20	S	H	18	1
42 : TCC / Family Ch.	10.994	1244	7.02	7.20	S	H	18	1
43 : UK Gold	11.553	1803	7.02	7.20	S	H	18	1
44 : QVC	11.038	1288	7.02	7.20	S	V	14	1
45 : UK Living	10.979	1229	7.02	7.20	S	V	14	1

Astra 1A+1B+1C, 19.2° east, television

46 : MTV Europe	11.421	1671	7.02	7.20	S	H	18	1
47 : Mini Max	11.009	1259	7.02	7.20	S	V	14	1
48 : Cine Classics	11.068	1318	7.02	7.20	S	V	14	1
49 : Cinemania	11.656	1906	7.02	7.20	S	V	14	1
50 : Documania	11.686	1936	7.02	7.20	S	V	14	1

Astra 1D, 19.2° east, television

51 :	10.714	964	7.02	7.20	S	H	18	1
52 :	10.729	979	7.02	7.20	S	V	14	1
53 :	10.744	994	7.02	7.20	S	H	18	1
54 :	10.758	1008	7.02	7.20	S	V	14	1
55 :	10.773	1023	7.02	7.20	S	H	18	1
56 :	10.788	1038	7.02	7.20	S	V	14	1
57 :	10.803	1053	7.02	7.20	S	H	18	1
58 :	10.817	1067	7.02	7.20	S	V	14	1
59 :	10.832	1082	7.02	7.20	S	H	18	1
60 :	10.847	1097	7.02	7.20	S	V	14	1
61 :	10.862	1112	7.02	7.20	S	H	18	1
62 :	10.876	1126	7.02	7.20	S	V	14	1
63 :	10.891	1141	7.02	7.20	S	H	18	1
64 :	10.906	1156	7.02	7.20	S	V	14	1

TV Sat 2, 19.0° west, D2 MAC, television

65 : RTL	11.747	997	dig	n1 f1	S	L	18	1
66 : SAT 1	11.823	1073	dig	n1 f1	S	L	18	1
67 : 3 sat	11.900	1150	dig	n1 f1	S	L	18	1

Astra 1A+1B+1C, 19.2° east, radio

68 : N-Joy Radio	11.464	1714	7.38	7.56	S	H	18	1
69 : Sunrise Radio	11.479	1729	7.38	7.56	M	V	14	1
70 : Radio Schweden	11.597	1847	7.74	7.92	M	V	14	1
71 : Q-CMR	11.509	1759	7.38	7.56	M	V	14	1
72 : QEFM	11.436	1686	7.38	7.56	S	V	14	1

Channel programme	Transponder frequency GHz	1. IF MHz	Sound IF		mono stereo	Polarization	LNB voltage volt	SAT
			left	right				
73 : ASDA-FM 1	11.436	1686	7.92	7.74	M	V	14	1
74 : Limerick 95	11.538	1788	7.92	7.74	M	V	14	1
75 : Radio Super Gold	11.377	1627	7.92	7.74	M	V	14	1
76 : Virgin 1215	11.377	1627	7.38	7.56	S	V	14	1
77 : Deutsche Welle fr.	11.229	1479	7.92	7.74	M	V	14	1
78 : Deutsche Welle fr.	11.229	1479	7.74	7.92	M	V	14	1
79 : World Radio Netw.	11.538	1788	7.74	7.92	M	V	14	1
80 : BBC Radio 5	11.553	1803	7.92	7.74	M	H	18	1
81 : BBC Radio 4	11.553	1803	7.56	7.38	M	H	18	1
82 : BBC Radio 3	10.979	1229	7.74	7.92	S	V	14	1
83 : BBC Radio 2	11.553	1803	7.74	7.92	M	H	18	1

Astra 1A+1B+1C, 19.2° east, radio

84 : BBC Radio 1 FM	10.979	1229	7.38	7.56	S	V	14	1
85 : BBC World Service	11.553	1803	7.38	7.56	M	H	18	1
86 : CNN Radio	11.627	1877	7.92	7.74	M	V	14	1
87 : WDR 2	11.053	1303	7.38	7.56	S	H	18	1
88 : NDR 4 MW	11.582	1832	7.92	7.74	M	H	18	1
89 : NDR 4 UKW	11.582	1832	7.74	7.92	M	H	18	1
90 : NDR 2	11.582	1832	7.38	7.56	S	H	18	1
91 : Radio Eviva	11.332	1582	7.74	7.92	S	H	18	1
92 : MDR SpuDTnik	11.112	1362	7.38	7.56	S	H	18	1
93 : DR Kultur	11.347	1597	7.74	7.92	S	V	14	1
94 : DR DLF	11.347	1597	7.38	7.56	S	V	14	1
95 : Deutsche Welle	11.229	1479	7.38	7.56	S	V	14	1
96 : RTL Radio	11.391	1641	7.38	7.56	S	H	18	1
97 : SWF 3	11.494	1744	7.38	7.56	S	H	18	1
98 : STAR*SAT Radio	11.406	1656	7.38	7.56	S	V	14	1
99 : Radio Ropa Info	11.406	1656	7.74	7.92	S	V	14	1

Table 2: V/H LNB

LOF: 10 GHz in the range of 10.950 ... 11.699 GHz
 LOF: 10.750 GHz in the range of 11.7 ... 12.499 GHz

polarization commutation: 14/18 volt

Channel programme	Transponder frequency GHz	1. IF MHz	Sound IF		mono stereo	Polarization	LNB voltage volt	SAT
			left	right				

Astra 1A+1B+1C, 19.2° east, television

1 : ARD	11.494	1494	7.02	7.20	S	H	18	1
2 : ZDF	10.964	964	7.02	7.20	S	H	18	1
3 : PRO 7	11.406	1406	7.02	7.20	S	V	14	1
4 : SAT 1	11.288	1288	7.02	7.20	S	V	14	1
5 : RTL Television	11.229	1229	7.02	7.20	S	V	14	1
6 : RTL 2	11.214	1214	7.02	7.20	S	H	18	1
7 : West 3	11.053	1053	7.02	7.20	S	H	18	1
8 : Bayern 3	11.141	1141	7.02	7.20	S	H	18	1
9 : Suedwest 3	11.186	1186	7.02	7.20	S	V	14	1
10 : Nord 3	11.582	1582	7.02	7.20	S	H	18	1
11 : MDR 3	11.112	1112	7.02	7.20	S	H	18	1
12 : 3 sat	11.347	1347	7.02	7.20	S	V	14	1
13 : Vox	11.273	1273	7.02	7.20	S	H	18	1
14 : DSF	11.523	1523	7.02	7.20	S	H	18	1
15 : Eurosport	11.259	1259	7.20	7.02	M	V	14	1
16 : n-tv	11.641	1641	7.02	7.20	S	H	18	1
17 : M T V EUROPE	11.538	1538	7.02	7.20	S	V	14	1
18 : CNN	11.627	1627	7.02	7.20	M	V	14	1
19 : Sky news	11.377	1377	7.02	7.20	S	V	14	1
20 : Galavision	11.127	1127	7.02	7.20	S	V	14	1
21 : Cartoon / TNT	11.023	1023	7.02	7.20	S	H	18	1
22 : RTL 4	11.391	1391	7.02	7.20	S	V	14	1
23 : Premiere	11.464	1464	7.02	7.20	S	H	18	1
24 : Teleclub	11.332	1332	7.02	7.20	M	H	18	1
25 : FilmNet Plus	11.362	1362	dig	n1 f1	S	H	18	1
26 : TV 1000	11.303	1303	dig	n1 f1	S	H	18	1
27 : TV 3 Schweden	11.244	1244	dig	n1 f1	S	H	18	1
28 : TV 3 Daenemark	11.612	1612	dig	n1 f1	S	H	18	1
29 : TV 3 Norwegen	11.671	1671	dig	n1 f1	S	H	18	1
30 : JSTV	11.568	1568	7.02	7.20	S	V	14	1
31 : Sky one	11.318	1318	7.02	7.20	S	V	14	1
32 : Sky Movies	11.436	1436	7.02	7.20	S	V	14	1
33 : Movie Channel	11.479	1479	7.02	7.20	S	V	14	1
34 : Sky Movies Gold	11.597	1597	7.02	7.20	S	V	14	1
35 : Sky Sports	11.509	1509	7.02	7.20	S	V	14	1
36 : Sky Sports 2	11.171	1171	7.02	7.20	S	H	18	1
37 : Nickelodeon	11.156	1156	7.02	7.20	S	V	14	1
38 : Bravo	11.097	1097	7.02	7.20	S	V	14	1
39 : Discovery / CMT	11.082	1082	7.02	7.20	S	H	18	1
40 : TCC / Family Ch.	10.994	994	7.02	7.20	S	H	18	1
41 : UK Gold	11.553	1553	7.02	7.20	S	H	18	1
42 : QVC	11.038	1038	7.02	7.20	S	V	14	1
43 : UK Living	10.979	979	7.02	7.20	S	V	14	1
44 : MTV Europe	11.421	1421	7.02	7.20	S	H	18	1
45 : Mini Max	11.009	1009	7.02	7.20	S	V	14	1
46 : Cine Classics	11.068	1068	7.02	7.20	S	V	14	1

Astra 1A+1B+1C, 19.2° east, television

47 : Cinemania	11.656	1656	7.02	7.20	S	V	14	1
48 : Documania	11.686	1686	7.02	7.20	S	V	14	1

Channel programme	Transponder frequency GHz	1. IF MHz	Sound IF		mono stereo	Polarization	LNB voltage volt	SAT
			left	right				

TV Sat 2, 19.0° west, D2 MAC, television

49 : RTL	11.747	997	dig	n1 f1	S	L	18	1
50 : SAT 1	11.823	1073	dig	n1 f1	S	L	18	1
51 : 3 sat	11.900	1150	dig	n1 f1	S	L	18	1

Astra 1A+1B+1C, 19.2° east, radio

52 : Schweizer Radio I.	11.332	1332	7.20	7.02	M	H	18	1
53 : Radio Asia	11.597	1597	7.38	7.56	M	V	14	1
54 : Cadena Dial	11.656	1656	7.56	7.38	M	V	14	1
55 : QEFM	11.436	1436	7.38	7.56	S	V	14	1
56 : ASDA-FM 2	11.436	1436	7.74	7.92	M	V	14	1
57 : RMF FM	11.421	1421	7.74	7.92	S	H	18	1
58 : Holland FM	11.479	1479	7.56	7.38	M	V	14	1
59 : Radio 538	11.318	1318	7.74	7.92	S	V	14	1
60 : Sky Radio	11.318	1318	7.38	7.56	S	V	14	1
61 : Happy RTL	11.391	1391	7.74	7.92	S	H	18	1
62 : N-Joy Radio	11.464	1464	7.38	7.56	S	H	18	1
63 : Sunrise Radio	11.479	1479	7.38	7.56	M	V	14	1
64 : Radio Schweden	11.597	1597	7.74	7.92	M	V	14	1
65 : Q-CMR	11.509	1509	7.38	7.56	M	V	14	1
66 : UCB	11.509	1509	7.56	7.38	M	V	14	1
67 : ASDA-FM 1	11.436	1436	7.92	7.74	M	V	14	1
68 : Limerick 95	11.538	1538	7.92	7.74	M	V	14	1
69 : Radio Super Gold	11.377	1377	7.92	7.74	M	V	14	1
70 : Virgin 1215	11.377	1377	7.38	7.56	S	V	14	1
71 : IC Radio 5	11.288	1288	8.50	7.56	M	V	14	1
72 : IC Radio 4	11.288	1288	8.35	7.74	M	V	14	1
73 : IC Radio 3	11.288	1288	8.15	7.56	M	V	14	1
74 : IC Radio 2	11.288	1288	7.90	7.74	M	V	14	1
75 : IC Radio 1	11.288	1288	7.74	7.92	M	V	14	1
76 : Deutsche Welle fr.	11.229	1229	7.92	7.74	M	V	14	1
77 : Deutsche Welle fr.	11.229	1229	7.74	7.92	M	V	14	1
78 : World Radio Netw.	11.538	1538	7.74	7.92	M	V	14	1
79 : BBC Radio 5	11.553	1553	7.92	7.74	M	H	18	1
80 : BBC Radio 4	11.553	1553	7.56	7.38	M	H	18	1
81 : BBC Radio 3	10.979	979	7.74	7.92	S	V	14	1
82 : BBC Radio 2	11.553	1553	7.74	7.92	M	H	18	1
83 : BBC Radio 1 FM	10.979	979	7.38	7.56	S	V	14	1
84 : BBC World Service	11.553	1553	7.38	7.56	M	H	18	1
85 : CNN Radio	11.627	1627	7.92	7.74	M	V	14	1
86 : WDR 4	11.053	1053	7.74	7.92	S	H	18	1
87 : WDR 2	11.053	1053	7.38	7.56	S	H	18	1

Astra 1A+1B+1C, 19.2° east, radio

88 : NDR 4 MW	11.582	1582	7.92	7.74	M	H	18	1
89 : NDR 4 UKW	11.582	1582	7.74	7.92	M	H	18	1
90 : NDR 2	11.582	1582	7.38	7.56	S	H	18	1
91 : Radio Eviva	11.332	1332	7.74	7.92	S	H	18	1
92 : MDR SpuDTnik	11.112	1112	7.38	7.56	S	H	18	1
93 : DR Kultur	11.347	1347	7.74	7.92	S	V	14	1
94 : DR DLF	11.347	1347	7.38	7.56	S	V	14	1
95 : Deutsche Welle	11.229	1229	7.38	7.56	S	V	14	1
96 : RTL Radio	11.391	1391	7.38	7.56	S	H	18	1
97 : SWF 3	11.494	1494	7.38	7.56	S	H	18	1
98 : STAR*SAT Radio	11.406	1406	7.38	7.56	S	V	14	1
99 : Radio Ropa Info	11.406	1406	7.74	7.92	S	V	14	1

Table 3: CombySat LNB

frequency range	LOF	LNB voltage
10.7 ... 11.699 GHz	9.75 GHz	14 V
11.7 ... 12.499 GHz	10.75 GHz	18 V
12.5 ... 12.750 GHz	10.75 GHz	18 V

related skew values:

polarization	frequency range	skew
V		0
L		-16
R		14
H	< 11 701	34
H	11 701 - 12 500	26
H	12 501 - 12 550	22
H	12 551 - 12 600	20
H	> 12 600	18

Channel programme	Transponder frequency GHz	1. IF MHz	Sound IF		mono stereo	Polarization	LNB voltage volt	SAT
			left	right				

Telecom 2B, 5.0° west, television

1 : M6	12.522	1772	5.80	6.60	M	V	18	3
2 : France 2	12.564	1814	5.80	6.60	M	V	18	3
3 : ARTE	12.606	1856	5.80	6.60	M	V	18	3
4 : Monte Carlo TV	12.648	1898	5.80	6.60	M	V	18	3
5 : TF1	12.690	1940	5.80	6.60	M	V	18	3
6 : RTL Television	12.732	1982	5.80	6.60	M	V	18	3
7 : Cine Cinemas	12.669	1919	dig	n1 f1	S	H	18	3
8 : Cine Cinefil	12.627	1877	dig	n1 f1	S	H	18	3

Telecom 2A, 8.0° west, television

9 : MCM Euromusique	12.543	1793	7.02	7.20	S	H	18	2
10 : Planete	12.585	1835	6.60	5.80	M	H	18	3
11 : Cine Cinefil	12.627	1877	6.60	5.80	M	H	18	3
12 : Cine Cinemas	12.669	1919	6.60	5.80	M	H	18	3
13 : Eurosport	12.711	1961	6.60	5.80	M	H	18	3
14 : Canal Plus	12.648	1898	7.02	7.20	S	V	18	2
15 : Canal Jimmy	12.732	1982	6.60	5.80	M	V	18	3
16 : Paris Premiere	12.564	1814	6.60	5.80	M	V	18	3
17 : Canal Plus	12.522	1772	dig	n1 f1	S	V	18	3
18 : France 2	12.606	1856	dig	n1 f1	S	V	18	3
19 : Cine Cinemas	12.690	1940	dig	n1 f1	S	V	18	3

Telecom 2B, 5.0° west, radio

20 : R. Mosquetaire	12.522	1772	6.40	8.65	M	V	18	3
21 : Europe 1	12.522	1772	6.85	8.20	S	V	18	3
22 : Mood Music/Unico	12.522	1772	7.75	7.25	M	V	18	3
23 : AFP Audio	12.564	1814	7.75	8.65	S	V	18	3
24 : FM Palapa	12.564	1814	6.40	6.85	M	V	18	3
25 : RTL	12.606	1856	6.85	8.20	S	V	18	3
26 : Classic FM	12.606	1856	7.75	8.65	S	V	18	3
27 : RMC	12.648	1898	6.85	8.20	S	V	18	3

Channel programme	Transponder frequency GHz	1. IF MHz	Sound IF		mono stereo	Polarization	LNB voltage volt	SAT
			left	right				
28 : Grand Magasins	12.648	1898	6.40	6.85	M	V	18	3
29 : M 40	12.564	1814	7.25	8.20	S	V	18	3
30 : Cherie FM	12.564	1814	6.85	8.20	M	V	18	3
31 : Radio Fourviere	12.522	1772	8.65	7.75	M	V	18	3

Telecom 2A, 8.00 west, radio

32 : R. France Hector	12.669	1919	7.02	7.20	S	H	18	2
-----------------------	--------	------	------	------	---	---	----	---

Tele X, 5.00 east, television

33 : TV 4 Swedish	12.207	1457	7.02	7.20	S	L	18	1
34 : TV 5 Nordic	12.475	1725	7.02	7.20	S	L	18	1
35 : NRK - TV	12.322	1572	dig	n1 f1	S	L	18	1

Tele X, 5.00 east, radio

36 : Radio Sweden Int.	12.207	1457	7.38	7.56	M	L	18	1
37 : The Voice	12.207	1457	7.74	7.92	S	L	18	1
38 : Radio Arlanda	12.475	1725	7.38	7.56	M	L	18	1
39 : TT News	12.475	1725	7.56	7.38	M	L	18	1
40 : Energy Stockholm	12.475	1725	8.46	8.64	M	L	18	1

Thor (DMAC), 1.0° west, television

41 : CNN Int.	11.785	1035	dig	n1 f1	S	R	18	2
42 : Eurosport	11.862	1112	dig	n1 f1	S	R	18	2
43 : FilmNet	12.015	1265	dig	n1 f1	S	R	18	2
44 : Childrens Channel	11.938	1188	dig	n1 f1	S	R	18	2
45 : MTV Europe	12.092	1342	dig	n1 f1	S	R	18	2

Intelsat VA F12, 1.0° west, television

46 : TV Norge	11.016	1266	6.60	7.02	M	H	14	2
47 : TV 4 Norge	11.133	1383	dig	n1 f1	S	H	14	2
48 : Kanal 1	11.681	1931	dig	n1 f1	S	H	14	2
49 : STV 2	11.177	1427	dig	n1 f1	S	H	14	2
50 : TV1, Israel	11.595	1845	6.60	7.02	M	V	14	2
51 : TV2, Israel	11.180	1430	6.60	7.02	M	V	14	2

Intelsat 515, 18.5° west, television

52 : TV Norge / UTV	11.016	1266	6.60	7.02	M	H	14	2
53 : TV 2 Norge	11.541	1791	dig	n1 f1	S	H	14	2
54 : Kanal 1	11.133	1383	dig	n1 f1	S	H	14	2
55 : STV 2	11.177	1427	dig	n1 f1	S	H	14	2

Intelsat 515, 18.5° west, radio

56 : Radio Nettverk	11.016	1266	7.38	7.56	M	H	14	2
57 : Radio Nordsee	11.016	1266	7.74	7.92	M	H	14	2

Table 4: Tripleband LNB

frequency range	LOF	LNB voltage
10.95 ... 11.699 GHz	10.00 GHz	14 V
11.70 ... 12.499 GHz	10.75 GHz	18 V
12.50 ... 12.750 GHz	10.75 GHz	18 V

related skew values:

polarization	frequency range	skew
V		0
L		-16
R		14
H	< 11 701	34
H	11 701 - 12 500	26
H	12 501 - 12 550	22
H	12 551 - 12 600	20
H	> 12 600	18

Channel programme	Transponder frequency GHz	1. IF MHz	Sound IF		mono stereo	Polarization	LNB voltage volt	SAT
			left	right				

Telecom 2B, 5.00 west, television

1 : M6	12.522	1772	5.80	6.60	M	V	18	3
2 : France 2	12.564	1814	5.80	6.60	M	V	18	3
3 : ARTE	12.606	1856	5.80	6.60	M	V	18	3
4 : Monte Carlo TV	12.648	1898	5.80	6.60	M	V	18	3
5 : TF1	12.690	1940	5.80	6.60	M	V	18	3
6 : RTL Television	12.732	1982	5.80	6.60	M	V	18	3
7 : Cine Cinemas	12.669	1919	dig	n1 f1	S	H	18	3
8 : Cine Cinefil	12.627	1877	dig	n1 f1	S	H	18	3

Telecom 2A, 8.00 west, television

9 : MCM Euromusique	12.543	1793	7.02	7.20	S	H	18	3
10 : Planete	12.585	1835	6.60	5.80	M	H	18	3
11 : Cine Cinefil	12.627	1877	6.60	5.80	M	H	18	3
12 : Cine Cinemas	12.669	1919	6.60	5.80	M	H	18	3
13 : Eurosport	12.711	1961	6.60	5.80	M	H	18	3
14 : Canal Plus	12.648	1898	7.02	7.20	S	V	18	3
15 : Canal Jimmy	12.732	1982	6.60	5.80	M	V	18	3
16 : Paris Premiere	12.564	1814	6.60	5.80	M	V	18	3
17 : Canal Plus	12.522	1772	dig	n1 f1	S	V	18	3
18 : France 2	12.606	1856	dig	n1 f1	S	V	18	3
19 : Cine Cinemas	12.690	1940	dig	n1 f1	S	V	18	3

Telecom 2B, 5.00 west, radio

20 : R. Mosquetaire	12.522	1772	6.40	8.65	M	V	18	3
21 : Europe 1	12.522	1772	6.85	8.20	S	V	18	3
22 : Mood Music/Unico	12.522	1772	7.75	7.25	M	V	18	3
23 : AFP Audio	12.564	1814	7.75	8.65	S	V	18	3
24 : FM Palapa	12.564	1814	6.40	6.85	M	V	18	3
25 : RTL	12.606	1856	6.85	8.20	S	V	18	3
26 : Classic FM	12.606	1856	7.75	8.65	S	V	18	3
27 : RMC	12.648	1898	6.85	8.20	S	V	18	3

Channel programme	Transponder frequency GHz	1. IF MHz	Sound IF		mono stereo	Polarization	LNB voltage volt	SAT
			left	right				

Intelsat VI F1, 27.5°west, television

58 : Lifestyle plus	11.135	1385	6.65	7.02	M	H	14	2
59 : CMT Europe	11.515	1765	7.02	7.20	S	V	14	2
60 : SSVC TV	11.562	1812	6.65	7.02	M	V	14	2
61 : Bravo	11.055	1305	7.02	7.20	S	H	14	2
62 : Parliamentary Ch.	11.095	1345	6.65	7.02	M	H	14	2
63 : EBU PVS/WSHT	11.475	1725	6.65	7.02	M	V	14	2
64 : BBC World Service	10.995	1245	dig	n1 f1	S	V	14	2
65 : Filmmax	11.665	1915	dig	n1 f1	S	H	14	2
66 : Learning Channel	11.095	1345	7.02	7.20	S	H	14	2
67 : Kindernet/Trav. Ch	11.175	1425	6.65	7.02	M	H	14	2

Intelsat VI F1, 27.5°west, radio

68 : BFBS 1	11.562	1812	7.02	7.20	M	V	14	2
69 : BFBS 2	11.562	1812	6.12	6.84	M	V	14	2
70 : BFBS 3	11.562	1812	6.30	6.48	M	V	14	2
71 : BBC for Europe	11.562	1812	7.56	7.38	M	V	14	2

Eutelsat II F3, 16.0°east, television

72 : RTM Marocco	10.972	1222	6.60	7.02	M	V	14	2
73 : HBB TV	11.617	1867	6.60	7.02	M	V	14	2
74 : TV 7 Tunesienne	11.658	1908	6.60	7.02	M	V	14	2
75 : Zagreb/EUROSTEP	10.987	1237	6.65	7.02	M	H	14	2
76 : TGRT	11.095	1345	6.65	7.02	M	V	14	2
77 : Egypt. Sat. Ch.	11.178	1428	6.60	7.02	M	V	14	2
78 : TV Shqiptar	11.575	1825	6.60	7.02	M	V	14	2
79 : Nile TV Intern.	11.145	1395	6.65	7.02	M	V	14	2
80 : Duna TV	11.596	1846	6.50	7.02	M	H	14	2
81 : TV Polonia	11.080	1330	6.65	7.02	M	H	14	2
82 : Polsat	11.638	1888	7.02	7.20	S	H	14	2
83 : Canal Plus Polen	11.678	1928	7.02	7.20	S	H	14	2
84 : TV Plus	11.556	1806	dig	n1 f1	S	H	14	2
85 : BT Bus./Muslim TV	11.163	1413	dig	n1 f1	S	H	14	2
86 : Business	12.522	1772	6.60	7.02	M	H	18	2

Eutelsat II F1, 13.0°east, television

87 : Eurosport	10.972	1222	6.65	7.02	M	H	14	2
88 : RTL 2	11.095	1345	7.02	7.20	S	H	14	2
89 : Deutsche Welle	11.163	1413	6.65	7.02	M	V	14	2
90 : SAT 1 Bayern	11.617	1867	6.60	7.02	M	V	14	2
91 : Kabelkanal D2MAC	11.055	1305	dig	n1 f1	S	H	14	2
92 : VIVA	11.005	1255	7.02	7.20	S	H	14	2
93 : MTV Europe	11.659	1909	7.02	7.20	S	V	14	2
94 : Super Channel	10.987	1237	7.20	7.02	M	V	14	2
95 : Euronews	11.575	1825	6.65	7.02	M	V	14	2

Eutelsat II F1, 13.0°east, television

96 : TV 5 Europe	11.080	1330	6.60	7.02	M	V	14	4
97 : TRT int	11.181	1431	6.65	7.02	M	H	14	2
98 : mbc	11.555	1805	7.02	7.20	S	H	14	2
99 : E-Dubai TV	11.638	1888	7.02	7.20	S	H	14	2

Channel programme	Transponder frequency GHz	1. IF MHz	Sound IF		mono stereo	Polarization	LNB voltage volt	SAT
			left	right				
28 : Grand Magasins	12.648	1898	6.40	6.85	M	V	18	3
29 : M 40	12.564	1814	7.25	8.20	S	V	18	3
30 : Cherie FM	12.564	1814	6.85	8.20	M	V	18	3
31 : Radio Fourviere	12.522	1772	8.65	7.75	M	V	18	3

Telecom 2A, 8.00 west, radio

32 : R. France Hector	12.669	1919	7.02	7.20	S	H	18	2
-----------------------	--------	------	------	------	---	---	----	---

Tele X, 5.00 east, television

33 : TV 4 Swedish	12.207	1457	7.02	7.20	S	L	18	1
34 : TV 5 Nordic	12.475	1725	7.02	7.20	S	L	18	1
35 : NRK - TV	12.322	1572	dig	n1 f1	S	L	18	1

Tele X, 5.00 east, radio

36 : Radio Sweden Int.	12.207	1457	7.38	7.56	M	L	18	1
37 : The Voice	12.207	1457	7.74	7.92	S	L	18	1
38 : Radio Arlanda	12.475	1725	7.38	7.56	M	L	18	1
39 : TT News	12.475	1725	7.56	7.38	M	L	18	1
40 : Energy Stockholm	12.475	1725	8.46	8.64	M	L	18	1

Thor (DMAC), 1.00 west, television

41 : CNN Int.	11.785	1035	dig	n1 f1	S	R	18	2
42 : Eurosport	11.862	1112	dig	n1 f1	S	R	18	2
43 : FilmNet	12.015	1265	dig	n1 f1	S	R	18	2
44 : Childrens Channel	11.938	1188	dig	n1 f1	S	R	18	2
45 : MTV Europe	12.092	1342	dig	n1 f1	S	R	18	2

Intelsat VA F12, 1.00 west, televisio

46 : TV Norge	11.016	1016	6.60	7.02	M	H	14	2
47 : TV 4 Norge	11.133	1133	dig	n1 f1	S	H	14	2
48 : Kanal 1	11.681	1681	dig	n1 f1	S	H	14	2
49 : STV 2	11.177	1177	dig	n1 f1	S	H	14	2
50 : TV1, Israel	11.595	1595	6.60	7.02	M	V	14	2
51 : TV2, Israel	11.180	1180	6.60	7.02	M	V	14	2

Intelsat 515, 18.50 west, television

52 : TV Norge / UTV	11.016	1016	6.60	7.02	M	H	14	2
53 : TV 2 Norge	11.541	1541	dig	n1 f1	S	H	14	2
54 : Kanal 1	11.133	1133	dig	n1 f1	S	H	14	2
55 : STV 2	11.177	1177	dig	n1 f1	S	H	14	2

Intelsat 515, 18.50 west, radio

56 : Radio Nettverk	11.016	1016	7.38	7.56	M	H	14	2
57 : Radio Nordsee	11.016	1016	7.74	7.92	M	H	14	2

Channel programme	Transponder frequency GHz	1. IF MHz	Sound IF		mono stereo	Polarization	LNB voltage volt	SAT
			left	right				
58 : Lifestyle plus	11.135	1135	6.65	7.02	M	H	14	2
59 : CMT Europe	11.515	1515	7.02	7.20	S	V	14	2
60 : SSVK TV	11.562	1562	6.65	7.02	M	V	14	2
61 : Bravo	11.055	1055	7.02	7.20	S	H	14	2
62 : Parliamentary Ch.	11.095	1095	6.65	7.02	M	H	14	2
63 : EBU PVS/WSHT	11.475	1475	6.65	7.02	M	V	14	2
64 : BBC World Service	10.995	995	dig	n1 f1	S	V	14	2
65 : Filmmax	11.665	1665	dig	n1 f1	S	H	14	2
66 : Learning Channel	11.095	1095	7.02	7.20	S	H	14	2
67 : Kindernet/Trav. Ch	11.175	1175	6.65	7.02	M	H	14	2

Intelsat VI F1, 27.50 west, radio

68 : BFBS 1	11.562	1562	7.02	7.20	M	V	14	2
69 : BFBS 2	11.562	1562	6.12	6.84	M	V	14	2
70 : BFBS 3	11.562	1562	6.30	6.48	M	V	14	2
71 : BBC for Europe	11.562	1562	7.56	7.38	M	V	14	2

Eutelsat II F3, 16.00 east, television

72 : RTM Marocco	10.972	972	6.60	7.02	M	V	14	2
73 : HBB TV	11.617	1617	6.60	7.02	M	V	14	2
74 : TV 7 Tunesienne	11.658	1658	6.60	7.02	M	V	14	2
75 : Zagreb/EUROSTEP	10.987	987	6.65	7.02	M	H	14	2
76 : TGRT	11.095	1095	6.65	7.02	M	V	14	2
77 : Egypt. Sat. Ch.	11.178	1178	6.60	7.02	M	V	14	2
78 : TV Shqiptar	11.575	1575	6.60	7.02	M	V	14	2
79 : Nile TV Intern.	11.145	1145	6.65	7.02	M	V	14	2
80 : Duna TV	11.596	1596	6.50	7.02	M	H	14	2
81 : TV Polonia	11.080	1080	6.65	7.02	M	H	14	2
82 : Polsat	11.638	1638	7.02	7.20	S	H	14	2
83 : Canal Plus Polen	11.678	1678	7.02	7.20	S	H	14	2
84 : TV Plus	11.556	1556	dig	n1 f1	S	H	14	2
85 : BT Bus./Muslim TV	11.163	1163	dig	n1 f1	S	H	14	2
86 : Business	12.522	1772	6.60	7.02	M	H	18	2

Eutelsat II F1, 13.00 east, television

87 : Eurosport	10.972	972	6.65	7.02	M	H	14	2
88 : RTL 2	11.095	1095	7.02	7.20	S	H	14	2
89 : Deutsche Welle	11.163	1163	6.65	7.02	M	V	14	2
90 : SAT 1 Bayern	11.617	1617	6.60	7.02	M	V	14	2
91 : Kabelkanal D2MAC	11.055	1055	dig	n1 f1	S	H	14	2
92 : VIVA	11.005	1005	7.02	7.20	S	H	14	2
93 : MTV Europe	11.659	1659	7.02	7.20	S	V	14	2
94 : Super Channel	10.987	987	7.20	7.02	M	V	14	2
95 : Euronews	11.575	1575	6.65	7.02	M	V	14	2

Eutelsat II F1, 13.00 east, television

96 : TV 5 Europe	11.080	1080	6.60	7.02	M	V	14	4
97 : TRT int	11.181	1181	6.65	7.02	M	H	14	2
98 : mbc	11.555	1555	7.02	7.20	S	H	14	2

7. Troubleshooting notes

Error	Possible cause	Measures
No picture, no sound, display is off	no supply voltage	check mains cable and connector
No picture, no sound, display is on	cable connection is broken or missing television set is set to the wrong channel LNB has no power supply outdoor unit is adjusted incorrectly selected channel cannot be received by the outdoor unit	check all cable connections (see 3 „connection“) set channel 39 on the television set (see operating instructions of the TV set) check LNB feed (see 5.2.3.4. „LNB voltage“) adjust outdoor unit correctly choose a different channel (see 4.1.2 „channel selection“)
All satellite channels display „wavy lines“. A channel that ist received via antenna display „wavy lines“	receiver transmits on the same channel as a programme that is received via antenna receiver transmits on the same channel as a programme that ist received via antenna	change transmit channel on the receiver (see 3.1 „outdoor unit and television set“)
The picture is full of black and white points („little fish“)	heavy rain or snow outdoor unit ist adjusted incorrectly the polarizer is adjusted incorrectly paraboloidal-type reflector is too small at the receiving location	remove the snow from the outdoor unit adjust outdoor unit correctly set „skew“ (see 5.2.3.4 „LNB voltage“) use a bigger paraboloidal-type reflector
Picture o.k., wrong sound	a radio channel is set	switch to TV channel (see 4.1.2 „channel selection“)
Sound o.k., no picture	channel is encoded	connect the adequate decoder (see 3.4 „external decoder“)
Picture o.k., no sound	television is set to mute mode receiver is mute or volume is too low	check the volume on the television set check the volume on the receiver (see 4.1.3 „volume“)
Channel picture or sound disturbed, though working o.k. before	audio or video settings have been modified now the channel is encoded channel is no longer broadcasting	copy channels of the preprogrammation again (see 5. „programmation“) connect the adequate decoder (see 3.4 „external decoder“) no measures
The display indicates „C“ instead of „F“	the table with the preprogrammed channels is activated	switch the channel positions (see 4.1.2 „channel selection“)
Your individual programming has disappeared Some of the channels cannot be set with the channel keys	the complete table has been deleted the corresponding channels have been deleted	load a preprogrammed table (see 5 „programmation“) rememorize the channel (5 „programmation“)
A connected decoder does not decode	invalid code or invalid smart card	observe the decoder's operating instructions
	wrong scart input incorrect decoder signal has been set	check the connection (see 3.4 „external decoder“) correct the setting (see 3.4 „external decoder“)
The internal decoder does not decode	see 4.4.5 „automatic on screen display“	see 4.4.5 „automatic on screen display“

8. Technical data

Tuner

input frequency:	950-2050 MHz
input resistance:	75 ohms
input level:	44-78 dBV
input connection:	F connector
bandwidth:	27 MHz
tuning:	PLL frequency synthesis

Outdoor unit supply

LNB supply voltage:	14 V / 18 V switchable at a maximum of 400 mA modulation with 22.2 kHz, Vp-p = 500 mV can be switched off feed only in active mode, switchable to permanent feed using an internal coding jumper, also in standby mode
polarizer current:	-60 mA... + 60 mA adjustable in steps of approx. 2 mA

Video

deemphasis	
PAL:	CCIR REC 405-1
MAC:	according to MAC specification
output level:	Vp-p = 1 V
output:	SCART & CINCH connector
output resistance:	75 ohms
Decoder output mode of operation:	4 different signals switchable
output level:	Vp-p = 1 V or 0.4 V (flat)
output:	SCART & CINCH connector
output resistance:	75 ohms

Audio

carrier frequency (PAL):	5.5 ... 8.7 MHz
IF bandwidth (PAL):	130/200/280/380 kHz switchable
modes of operation (PAL):	mono/stereo switchable
deemphasis (PAL):	50 Ês, 75 Ês, J 17, adaptive (Panda-Wegener compatible) 50 Hz... 15 kHz
output level:	Vp-p = approx. 2 V in case of full drive
output:	SCART & CINCH connector (left, right)

HF modulator

UHF range:	channel 32...42 adjustable preset to channel 39
colour standard:	PAL G
UHF output level:	74 +/- 4 dBÊV
UHF output:	IEC male connecto
antenna input	IEC female connector